NOVEL FUSION PROTEINS FOR HIV VACCINE

SUMMARY

The National Cancer Institute's Cancer and Inflammation Program seeks parties to co-develop gp120 and CD4-induced antibody fusion proteins for use in an HIV vaccine.

REFERENCE NUMBER

E-256-2012

PRODUCT TYPE

- Therapeutics

KEYWORDS

- Research Tool
- antibody
- HIV
- fusion protein
- gp120
- CD4

COLLABORATION OPPORTUNITY

This invention is available for licensing and co-development.

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DESCRIPTION OF TECHNOLOGY

Development of successful HIV vaccine immunogens continues to be a major challenge. Although gp120 was identified as having significant potential as a vaccine immunogen, attempts to elicit broadly neutralizing antibodies using recombinant gp120 failed. The highly flexible gp120 may present numerous conformations to the humoral immune system that are not found on the viral spike. Therefore, they elicit antibodies that bind to recombinant gp120, but do not neutralize genetically diverse viruses. The presence of highly immunogenic non-neutralizing epitopes on gp120 may distract the immune system from response to conserved neutralizing epitopes, such as the CD4 binding site.

The National Cancer Institute's Cancer and Inflammation Program researchers improved the recognition of the HIV-1 gp120 CD4 binding site (CD4bs) by CD4 and antibodies targeting the CD4bs by fusing the

gp120 to CD4-induced (CD4i) antibodies. These novel fusion proteins (CD4i antibody-gp120) may be useful as potential vaccine immunogens that could be more efficient in eliciting the broadly neutralizing antibodies against HIV-1, or potentially as candidate HIV-1 therapeutics.

POTENTIAL COMMERCIAL APPLICATIONS

- As an immunogen in an HIV vaccine
- Research tools to study the conformational flexibility of gp120, the mechanisms of viral entry, and evasion of immune responses

COMPETITIVE ADVANTAGES

- The potential vaccine immunogens could be more efficient than gp120 alone
- Higher affinity for CD4 than gp120 alone, with antibodies directed against the CD4-binding site

INVENTOR(S)

Dimiter S Dimitrov (NCI)

DEVELOPMENT STAGE

- Discovery (Lead Identification)

PUBLICATIONS

1. Dey B, et al. Structure-based stabilization of HIV-1 gp120 enhances humoral immune responses to the induced co-receptor binding site. PLoS Pathog. 2009 May;5(5):el000445. [PMID 19478876]

2. Dey B, et al. Characterization of human immunodeficiency virus type 1 monomeric and trimeric gp120 glycoproteins stabilized in the CD4-bound state: antigenicity, biophysics, and immunogenicity. J Virol. 2007 Jun;81(11):5579-93. [PMID 17360741]

PATENT STATUS

- **Not Patented:** Research Tool, will not be patented.
- **Not Patented:** None

THERAPEUTIC AREA

- Immune System and Inflammation
- Infectious Diseases